

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
9 October 2008 (09.10.2008)

PCT

(10) International Publication Number  
WO 2008/120033 A1

- (51) International Patent Classification:  
G06F 17/27 (2006.01)
- (21) International Application Number:  
PCT/IB2007/001400
- (22) International Filing Date: 29 May 2007 (29.05.2007)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
60/908,786 29 March 2007 (29.03.2007) US
- (71) Applicant (for all designated States except US): **NOKIA CORPORATION** [FI/FI]; Keilalahdentie 4, FIN-02150 Espoo (FI).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **RIEMAN, John** [US/FI]; Aleksiskivenkatu 52-54 A3, FIN-00510 Helsinki (FI). **HEKANAHO, Minna** [FI/FI]; Meritullinraitti 8 A 5, FIN-90650 Oulu (FI). **KOUTONEN, Minna** [FI/FI]; Jokipellontie 1 B 7, FIN-90650 Oulu (FI). **RANTONEN, Tero** [FI/FI]; Notaarintie 4 A 15, FIN-90650 Oulu (FI).

- (74) Agent: **AWAPATENT AB**; Box 5117, S-200 71 Malmö (SE).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: PRIORITIZING WORDS BASED ON CONTENT OF INPUT

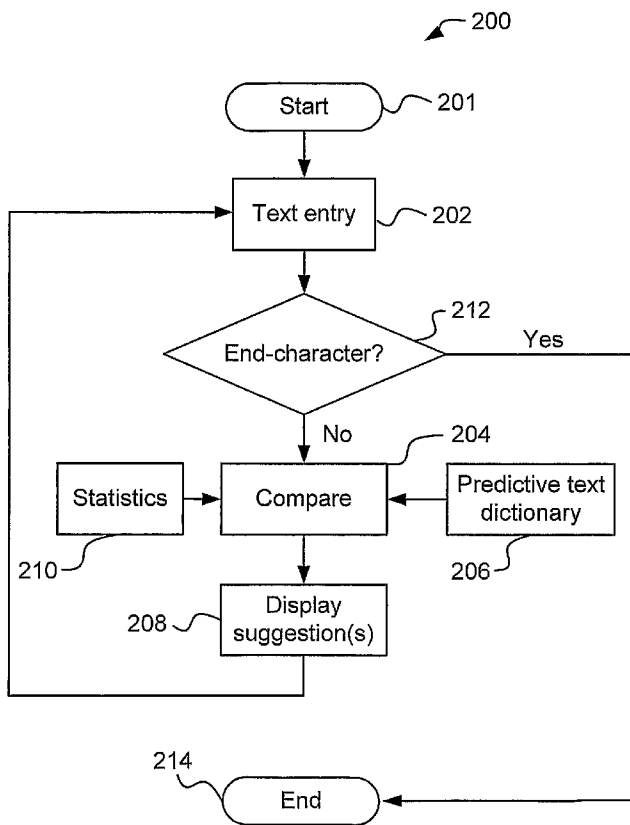


Fig. 2

(57) Abstract: A mobile communication apparatus comprising means for enabling the mobile communication apparatus for text input, comparing inputted text with alphanumerical characters and words in an adaptive predictive text dictionary, and prioritizing and listing matches in a priority list, and displaying the priority list to a user. Further enabling selection among matches on the displayed priority list, and enabling updating of the adaptive predictive text dictionary. A corresponding application, apparatus, system, user interface and a computer program product is also disclosed.

WO 2008/120033 A1



---

**Published:**

— *with international search report*

## PRIORITIZING WORDS BASED ON CONTENT OF INPUT

### **Technical field**

The present invention relates to methods for predicting and prioritizing words using a predictive text system with an adaptive dictionary in a portable  
5 apparatus, a rendering application, a portable apparatus comprising a display and means for navigating, a system, and a computer-readable medium having computer-executable components.

### **Background of the invention**

10 In our modern and busy world people are constantly on the move and therefore have lesser and lesser time to communicate with each other in real-time, e.g. via voice. People tend therefore to more and more converse via text messages using different messaging services such as short message service (SMS), e-mails, chats, blogs, instant messaging, etc..

15 One popular way of communicating these messages, when on the move, is by using some kind of handheld communication device such as a mobile phone, a PDA, a palmtop computer, etc.. Entering text messages into these handheld communication devices is often a cumbersome work. While some computing and communication devices, such as personal computers,  
20 palmtop computers, and some mobile phones have been equipped with a full QWERTY keyboard for alphanumeric text entry, many other computing and communication apparatuses, such as mobile phones, PDAs, and PDTs, are equipped with a limited or no keyboard. Entering text into computing and  
25 communication apparatuses with a limited or no keyboard can be done in several ways. If the apparatus have no keyboard or keys the text can be entered by either writing the text on a special surface, e.g. the screen of the apparatus, with a stylus, or by tapping on a virtual keyboard displayed on the apparatuses screen. Text entering using a keyboard with a limited number of  
30 keys is often done by pressing a key a varying number of times, generally within a limited period of time, to input a specific letter. This technique is

known as multi-tap. However, entering text with multi-tap or with a stylus is quite cumbersome for the user, especially if large quantities of text are going to be entered. Therefore, a number of text entering systems have been developed to facilitate and to speed-up the text entering. These systems, 5 often referred to as single-tap system with predictive text technologies, uses predictive letter patterns to allow the user to enter text by press the keys as few times as possible.

The predictive text system uses a predictive text dictionary to “intelligently guess” which character(s) or word(s) the user is about to enter. 10 The predictive text dictionary essentially contains a list of character strings, words, acronyms, abbreviations, etc. that is used to predict which word that is being entered by the user. When entering text using multi-tap or single-tap there may be several words that match a given keystroke(character)sequence. The predictive text system may then select 15 the best match(es), i.e. making a priority list of matching words, based on information about word frequency in the used language or word frequency in the users idiolect. However, this does not reflect the vocabulary changes in a person since the vocabulary used in these messages services may vary quite a lot depending such things as topic, physical and social context, recipient 20 etc.. However, there is a need for improving features related to text input as described above.

### **Summary of the invention**

In view of the above, an objective of the invention is to solve or at least 25 reduce the problems discussed above. In particular, an objective is to provide a user friendly and efficient text prediction system based on an adaptive predictive text dictionary.

According to a first aspect of the present invention, there is provided a method for a portable apparatus, comprising enabling said portable apparatus 30 for text input, comparing inputted text with text in an adaptive predictive text dictionary, prioritizing matches in said comparison and listing said matches based on said prioritizing in a priority list, displaying of said priority list,

enabling selection from said displayed priority list, and enabling updating of said adaptive predictive text dictionary based on said selection.

The method may comprise updating of said adaptive predictive text dictionaries based on any of the group: analysis of said inputted text, analysis  
5 of said selected text in said priority list, and statistics based on said inputted text and selected words in said displayed priority list.

The method may comprise initialization of the adaptive predictive text dictionary, wherein said initialization determines at least one of the group comprising: current user, current application, and recipient.

10 The method may comprise communicating by wire or wirelessly with an external server via a network for acquiring said dictionary.

The method may comprise storing said dictionaries via said network and retrieving said dictionaries from said external server.

According to a second aspect of the present invention, there is  
15 provided a rendering application for a portable apparatus comprising a display and navigation means, said application arranged to cause enabling of said portable apparatus for text input, comparing inputted text with text in an adaptive predictive text dictionary, prioritizing matches in said comparison and listing said matches based on said prioritizing in a priority list, displaying  
20 of said priority list, enabling selection from said displayed priority list, and enabling updating of said adaptive predictive text dictionary based on said selection.

According to a third aspect of the present invention, there is provided an apparatus comprising a display and a comparator arranged to receive a  
25 user input, wherein said user input comprise of a text input, compare inputted text with text in an adaptive predictive text dictionary, a processor arranged to prioritize and list matches of an output of said comparator in a priority list, wherein said display is arranged to, under control of said processor to display said priority list, and wherein said user input selection from said displayed  
30 priority list, wherein said processor is arranged to update said adaptive predictive text dictionary based on said selection.

According to a fourth aspect of the present invention, there is provided a computer program product comprising program code means stored in a

computer-readable medium, the program code means being adapted to enable said portable apparatus for text input, comparing inputted text with text in an adaptive predictive text dictionary, prioritizing matches in said comparison and listing said matches based on said prioritizing in a priority list, displaying of said priority list, enabling selection from said displayed priority list, and enabling updating of said adaptive predictive text dictionary based on said selection.

According to a fifth aspect of the present invention, there is provided a system comprising an apparatus according to the third aspect of the invention, and a dictionary server arranged to provide the associated dictionary for downloading.

The system may comprise a communications network, wherein the dictionary server and the apparatus is in communication via the communications network.

According to a sixth aspect of the present invention, there is provided a user interface comprising

a display, and an input receiver, wherein said user interface is arranged to enable a portable apparatus for text input where said inputted text are compared with text in an adaptive predictive text dictionary, and where matches of said comparisons are prioritized and listed in a priority list, and to display said priority list in said display.

The second, third, fourth, fifth and sixth aspects of the present invention may be combined in any way with the features of the first aspect of the present invention.

In the above description a renderer should be interpreted as a functional block applicable to any communication device, such as a mobile phone, capable of performing at least one of the following tasks; inputting, prioritizing, displaying, enabling, selecting, and updating.

Generally, all terms used in the claims are to be interpreted according to their ordinary meaning in the technical field, unless explicitly defined otherwise herein. All references to "a/an/the [element, device, component, means, step, etc]" are to be interpreted openly as referring to at least one

instance of said element, device, component, means, step, etc., unless explicitly stated otherwise. The steps of any method disclosed herein do not have to be performed in the exact order disclosed, unless explicitly stated. Other objectives, features and advantages of the present invention will appear from the following detailed disclosure, from the attached dependent claims as well as from the drawings.

### **Brief description of the drawings**

The above, as well as additional objects, features and advantages of the present invention, will be better understood through the following illustrative and non-limiting detailed description of preferred embodiments of the present invention, with reference to the appended drawings, where the same reference numerals will be used for similar elements, wherein:

Fig. 1 shows a mobile communication apparatus according to an embodiment of the present invention; and

Fig. 2 shows a flow chart describing a common character input process using a predictive text dictionary; and

Fig. 3 shows a display view of a handheld communication apparatus; and

Fig. 4 shows a flow chart describing a character input process using an adaptive predictive text dictionary; and

Fig. 5 shows a flow chart describing an initialization process; and

Fig. 6 shows the dictionary distribution in a communication device, a network, and an externally stored dictionary; and

Fig. 7 shows several dictionary update processes; and

Fig. 8 schematically illustrates a system according to an embodiment of the present invention; and

Fig. 9 illustrates a computer readable medium according to an embodiment of the present invention; and

Fig. 10 illustrates a user interface of the present invention.

### Detailed description of preferred embodiments

To better understand the problem addressed above a brief introduction  
5 is given.

When conversing in a business context formal words and expressions  
are often used, when conversing with acquaintances, elderly and certain  
family members (grandmother, grandfather etc.) informal but polite and  
respectful words and expressions are used, while casual and some time even  
10 profound words may be used with close friends and the immediate family.

Some predictive text systems may also change the priority of the  
predicted word(s) for example if the user frequently selecting the word 'me'  
instead of the alternative 'of'. However, the priority is based on long-term  
usage of a single user neglecting sudden changes.

15 The priority of the suggested words may also be based on which  
application it is used. For example when writing SMS, one priority of the  
matched words are given while another priority is given when text is entered  
into an e-mail. However, the predictive text systems do not take into account  
when a single user changes topic, physical and social context, and the  
20 recipient of the text. Neither does the predictive text system take into account  
if several persons with different language styles, for example mother and  
daughter, use the same mobile device. When the priority of the predicted  
words is wrong it will take unnecessary long time to navigating through the list  
matching words to be able to select the right word.

25 The approaches discussed above often results in that the text  
predictive system works unsatisfactory and to the user becomes unusable  
and is turned-off.

Figure 1 shows a mobile communication apparatus 100 comprising a  
30 display 102 and means 104 for navigating among items (not shown)  
displayed in a display area 102. The navigation means 104 can be a rotating  
input, a joystick, a touch pad, but can also be implemented using a touch  
sensitive display, wherein the displayed items directly can be tapped by a



user for selection, or be voice activated via a headset or a built-in microphone.

The mobile communication apparatus can also comprise other elements normally present in such an apparatus, such as a keypad 106, a speaker 108, a microphone 110, a processor (not shown), a memory (not shown), etc.

Figure 2 shows a flow chart illustrating a common process of entering text in a handheld communication device, such as a mobile phone, with a predictive text system 200. Text can, in this case, comprise any combination of the group: an alphanumerical character, a group of alphanumerical characters (forming words and sentences), a symbol(e.g. Chinese symbols), or a group of symbols. The alphanumerical characters can be entered 202 using a stylus, writing or tapping the characters on the screen or on a dedicated area of the apparatus, or by using all or some of the keys on the handheld communication apparatuses full or limited keyboard.

The last entered alphanumerical character is compared 212 with a predetermined and/or user configurable end-character such as a for example a 'space' character. If the entered 202 alphanumeric character is an end-character 212 the input of that specific character, group of characters, word, phrase, slang, abbreviation, etc. (hereinafter referred to as a word) is complete and the text entry ends 214. If the user continues to enter alphanumerical characters after the end-character, i.e. begins to input a new word, the process restarts 201, else the user have entered all the words to complete a message and terminates the input process.

If no end-character is detected 212 the character entry is continued and the alphanumeric character, either by itself or in combination with other previous added characters forming a word or a part of a word, are compared in 204 with characters, words, phrases, abbreviations, slang, etc. stored in a predictive text dictionary 206. The content of the dictionary 206 can be user-configurable in such way that words can be added/removed, new dictionaries can be downloaded and replace the dictionary in the handheld apparatus. The statistics in 210 stores information about a languages word frequency

and/or the users long-term word frequency. The statistics will provide useful information in the comparison (prediction) process 204. The statistics 210 may be connected to the predictive text dictionary so if the dictionary changes the statistics also changes, e.g. if a new predictive text dictionary in another language is downloaded new statistics for that language is also downloaded.

If one or several, complete or partial, matches between an entered word(s) 202 and words in the dictionary 206 are detected, they are made available, e.g. displayed on the screen of the handheld communication apparatus as a list of suggestions, to the user 208. If several matches are found the long-term statistics helps in deciding the prioritized order of the matches when displayed in the suggestions list. The user is then able to choose any of the available words from the displayed suggestions list using the navigation means 104 mentioned in conjunction with fig. 1. The character input process is continued 202 regardless of if the user chooses a word from the displayed list or continues to input characters. The input process continuous until an 'end character' is detected 212 or the character input is terminated by the user.

Figure 3 illustrates an example of a common display view in a handheld communication apparatus 300, running a predictive text system, comprising a general status indication section 302, a softkey bar 306 and a general display area 304. The general status indication section 302 can for example include symbols for battery status, reception quality, speaker on/off, present mode, clock time, etc. The status indication section is not in any way limited to only include these symbols. Thus, other symbols in any shape, form or color can occur. The softkey bar 306, situated at the bottom of the display view, is operable using the navigation means 104 mentioned in conjunction with Fig. 1. The functions of these softkeys are not limited by the functions indicated in the figure.

The preferred function of the general display area 304, residing between the status indication section 302 at the top and the softkey bar 306 at the bottom, is to display information from running applications in the handheld communication apparatus. In our case the display area 304 also

comprise a scroll bar 308, a suggestion list 314, inputted characters 310, and a cursor 312 showing where next character, word, phrase, abbreviation, etc. can be inputted.

Figure 3 shows an example of how a common predictive text system, such as described in figure 2, operates. A user has entered the characters 'D' and 'e' 310 which together with a cursor 312 is shown at the top of the display views display area 304. The last entered character is 'e' which in this case is not an end-character. The two characters 'D' and 'e' forms the word 'De' which is compared against the words and the letter combinations stored in the predictive text dictionary. Several matches are found and they are displayed to the user in a suggestion list 314. The displayed suggestions are 'De', 'Fe', and 'Dear' where 'De' is rated the most likely word (highest priority) and therefore displayed first in the list. 'Fe' is rated second most likely (priority 2) and 'Dear' rated third most likely (priority 3). Since the user in this example wants to enter the word 'Dear', the user have to navigated amongst the suggestions down to the suggestion 'Dear', indicated by the black cursor bar 316. The user selects 'Dear' by operating 'Select' in the softmenu and 'De' is replaced by 'Dear' 318 as shown in the figure. The user can continue to enter characters, for example a 's' to complete the word 'Dears' or enter a 'space', indicating that the word is complete and a new word is going to be entered, thus restarting the inputting and prediction process as described in conjunction with figure 2.

A common predictive text system as the one depicted in Figure 2 and exemplified in Figure 3, suffers from the problems discussed in the above section describing the background of the invention. One of the problems becomes clear in the example in Figure 3 where the user wants to enter the word 'Dear' into a message. In the example the predicted word 'Dear' is placed third on the suggestions list and not first as it should. This shows a clear problem with the prioritizing of the predicted words. Navigating and selecting the third alternative in the suggestions list requires nearly as many key actuations as entering the letters 'a' and 'r' manually which is clearly not beneficial. If the predictive text system had taken into account aspects such

as current application, recipient, current user etc. it would have placed the word 'Dear' first in the suggestions list.

Figure 4 shows a flow chart illustrating an embodiment of the present invention comprising a process of entering text in a handheld communication device, such as a mobile phone, with an adaptive predictive text system 400. The alphanumerical characters can be entered 402 using a stylus, writing or tapping the characters on the screen or a dedicated area of the apparatus, or by using all or some of the keys on the handheld communication apparatuses full or limited keyboard.

The last entered alphanumerical character is compared 404 with a predetermined or user configurable end-character such as for example a 'space' character. If the entered 402 alphanumeric character is an end-character 404 the input of that specific character, characters, word, phrase, slang, abbreviation, etc. is completed and the text entry is ended 418. If the user continues to enter alphanumerical characters after the end-character, i.e. begins to input a new word, the process restarts 401, else the user have entered all the words to complete a message and terminates the input process.

If no end-character is detected 404 the character entry is continued and the alphanumeric character, either by itself or in combination with other previous added characters forming a word or a part of a word, are compared in 406 with characters, words, phrases, abbreviations, slang, etc. stored in the current predictive text dictionary 412.

If one or several, complete or partial, matches between an entered character or word(s) 402 and words in the current predictive text dictionary 412 are detected, they are made available, e.g. displayed on the screen of the handheld communication apparatus as a list of suggestions 408, to the user. Multiple matches are displayed in the suggestions list in a prioritized order with the most likely first at the top of the list. Words that are never or seldom used by a user, words that in a specific context is unlikely to be chosen, and words that in a context is deemed inappropriate words can be made to (user configurable) not appear in the suggestion list 408, thus making the list considerably shorter. These measures will speed-up the

selection process considerably since the user does not have to navigate a long suggestions list to find the correct word. Optimally the wanted word is always displayed at the top of the suggestion list. The user is then able to choose any of the available words from the displayed suggestions list using the navigation means 104 mentioned in conjunction with fig. 1. The text input process is continued 402 regardless of if the user chooses a word from the displayed suggestion list 408 or just continues to input new characters 402. The input process continuous until an 'end character' is detected 404 or the text entry is terminated by the user.

10

The current predictive text dictionary 412 is and adaptive dictionary meaning that the content of the dictionary is subject for continuous change and adaptation depending on the vocabulary of the user, current application, recipient, previous entered text, current context, etc.. When the text entry process starts 401 the system will initialize 420, and the initialization process 420 will provide the current predictive text dictionary 412 with all or some of the parameters; user identification, application identification, and recipient identification. These parameters will provide help in using the correct predictive text dictionaries at the starting point for the prediction 412 and comparison 406 of the first entered characters or words. The initialization process 420 is described in more detail in figure 5.

20

There are two types of statistics 410 used in this text prediction process 400. Static statistics 410 such as a languages word frequency are one type used while a users word frequency and word frequency of specific categories of words belonging for example to a specific application, recipient etc. are another more dynamic type of statistics that can be utilized. Continues statistics of which words that are entered by the user, predicted and prioritized, and selected by a user is constantly recorded. The statistics will provide a basis for the determination of if the current dictionary needs to be modified in some way to better predict the users text input.

30

To help in the prioritizing process each word can be tagged to identify for instance how many times the word have been used, the degree of formality, inappropriate words, preferred words, words associated with specific recipients or a context. The tags can, if wanted, be user-configurable  
5 so for instance a preferred word can be set as non-preferred if wanted.

The statistics 410 along with information of which current predictive text dictionary(ies) 412 that are active and the entered text 402, are analyzed in 414 to determine if the current dictionary(ies) that is used is sufficient or if it  
10 needs to be updated/modified to better predict the users text input. If the analysis comes to the conclusion that the current dictionary(ies) is deficient in some way, the whole or parts of the dictionary(ies) are modified by adding or removing character combinations, words, abbreviations, phrases, etc.. Figure 6 and 7 will describe the dictionaries and the modification process in more  
15 detail. If the analysis can't come to a conclusion the parameters can be sent either wirelessly or by wire, depending how the handheld communication device is currently connected to a communications network 416, to an external server with more computational power for further analysis 416.

20 Figure 5 shows a flow chart describing an embodiment of the present invention comprising an initialization process of the predictive text dictionary system with an adaptive dictionary 500. When a user starts a message application (401 in Figure 4) an initialization process 500 is started to determine the optimal predictive text dictionary to use in the beginning of the  
25 dictionary adaptation process.

A handheld communication device can be shared amongst a plurality of users such as for example a family with the 3 family members; a father, a mother, and a daughter. Since every person in the family uses different vocabulary and has different styles when conversing via text messages, it is  
30 helpful to identify who the current user of the device is. In this way that users specific dictionary, or person specific words, can be loaded or added to the current dictionary. In 501 the current user of the handheld mobile device is identified. If the handheld communication device contains several user

accounts, e.g. one for each family member, the active user, the family member currently using the handheld device, can be identified by detecting which user account that is currently active. If the handheld communication device doesn't have several user accounts, all family members uses the same account, or a current user can't be determined 502, statistics 508 may optionally be used to "intelligently guess" who currently is using the handheld communication device. The statistics 508 can for instance provide information such as that 'User 1' has a high probability of using the handheld device between 6pm to 10pm on a week day, while 'User 2' is more likely to use the handheld device between 10am to 1pm on weekends, so if it is 11:23am a Saturday it is most likely 'User 2' who is using the hand held communication device. Other statistics such as basic user frequency, which applications that have been used up to now, etc..

In 506 the current running application(s) such as SMS, e-mail, chat, etc., is identified. This will be helpful in determine in which context the message is entered and to consequently load the current users context-based dictionary. The user may use one vocabulary style when writing an SMS and another when chatting.

In 510 the recipient of the text message is identified. Determining the recipient 510 is also helpful in loading the right context-based dictionary. For example if the user has started a SMS application the recipient of the SMS is analyzed. If for example the recipient is the grandmother a context-based dictionary with respectful and loving words, phrases, etc. is loaded since they are the most likely words to be used. When the recipient is (or not) identified the initialization process 420 provides the information to the current predictive text dictionary 412 in Figure 4, which loads the proper dictionary(ies). The current predictive text dictionary 412 will have 1 to 3 parameters (user, application, and recipient) coming from the initialization process 500 to help in determine the right predictive text dictionary(ies), and to set the right priority among the matches which later are displayed in the suggestion list 408 in Figure 4.

The handheld device 600 in Figure 6 may have, depending on available storage, one or more dictionaries stored 604 in the devices memory 602 at one time. If the storage size in the device is large a standard dictionary 603 (hereinafter called a full dictionary) together with several smaller  
5 customized dictionaries 604 can be stored in the device at the same time. If the storage size is small a reduced full dictionary or only one or more customized dictionaries 604 may be stored at the same time in the device. If the storage size is small it is important that the dictionary in the device is tailored to the user so no unnecessary words (i.e. words never or seldom  
10 used by the user) in the dictionary take up valuable storage space.

The full dictionary 603 stores a multitude of character combinations and words from every possible subject while a custom dictionary focus on just one or a few particular areas. A custom dictionary 604 can for instance be a  
15 user dictionary comprised of words commonly used by a user or all words from one time instance to another, e.g. from the day the device was first used by the user until current time and day. A custom dictionary can also comprise of the words used when a specific application has been used, for example words used when composing e-mails or SMS. Dictionaries can also be  
20 customized comprising words depending on context, words not appropriate (e.g. swear words), special interests (e.g. bird watching, computing, sports, beer, etc.), time and date, age group, recipient (e.g. friend, grandmother, co-worker, etc.).

25 If the comparison 406 in Figure 4 fails to identify one or more characters or words entered by a user, it may be time to update or replace the current predictive text dictionary 412 used in the prediction process. The analysis 414 of the entered characters and words in 402 will together with the statistics 410 information will detect if the current dictionary in 412 will need to  
30 be updated. The reasons for changing the current dictionary can be many. It could for example be the first time the handheld device is ever used; the user has changed vocabulary, another user that the ordinary user uses the handheld device, a new recipient (e.g. started at a new word), or any other



reason for changing vocabulary. Another reason to change the current dictionary can for instance be when it has expired. A dictionary can be set to expire at a certain point in time for example when the handheld device becomes active (turned off), turns into sleep mode, turns into screensaver mode, when an application is terminated, an SMS, email or other text application is ended, etc.. It can also be set to expire after a certain amount of time, on a specific date, or after running a certain application a specific number of times, or when the memory is full and another dictionary downloaded to the device. This avoids that the dictionary becomes irrelevant or stale due to the user getting older (matures and changes vocabulary) or the user and/or the context changes. Over time the user or users may change their behavior and degree of formality in their text correspondence. When people grow up they tend to mature into using a more formal tone in their correspondence with other people, even with their close friends. To be able to update or replace the dictionary the inputted text is stored for analysis as shown in 414 in Figure 4. For example if a text input starts with 'Yo' (as in 'Yo brother what's up') it is very likely that the user is communicating with a close friend in a not so formal way but if the user starts with 'Hi' it could either be a close friend ('Hi Melissa how are you?') or a more formal conversation ('Hi my name is Inga and I'm writing...'), and if the user starts with 'Dear' (as in 'Dear grandmother ...' or 'Dear Mr Wick ...') it is probably a more formal conversation.

If the analysis in 414 can't directly identify clues and keywords for determining the right dictionary or combination of dictionaries the analysis process can be user-configured to continue analyzing for a certain amount of time (e.g. two or more entered words, one or more inputted sentences, etc.). It can also be configured to send the analysis material to an external server 416 having a much greater database and more computational power than the handheld device. The external server will send back instructions and if needed additional dictionaries to the handheld device.

Figure 6 illustrates how the dictionaries relate to each other. The communication device 600 can hold 602 one current dictionary 603 used as

the current predictive text dictionary and, if possible, several smaller customized dictionaries 604. As discussed above the handheld device 600 can communicate with an external server, via a network 606, storing a multitude of dictionaries 605. The update process of the current dictionary can  
5 either be done by adding-on, as shown in 718 in Figure 7, a dictionary by copying or moving a whole or a part 720 of a stored custom dictionary 722 into the current dictionary 716, or by replacing the whole or a part 714 of the current dictionary 710 with a whole or a part 712 of a custom dictionary 714, or by using a union 706 of several dictionaries for example the current  
10 dictionary 702, a first custom dictionary 704, and a second custom dictionary 708, as shown in figure 7. The custom dictionaries can be either internally stored as shown in 604 in Figure 6 or externally stored 605.

As discussed above the internally stored dictionaries 604, can if wanted, be in constant change depending on the users change in vocabulary  
15 etc.. To be able to safely store and to migrate the dictionaries to other handheld communication devices the dictionaries can be sent 606 to an external storage for safekeeping. The external storage can either be the same as the server 605 doing the analysis and storing external dictionaries as discussed above or a separate personal storage place. This will also save  
20 precious internal storage in the handheld communication device since not all custom dictionaries are needed to be stored internally.

A system architecture for managing a system 800 according to an embodiment of the present invention is shown in Fig. 8. A Home Location  
25 Register (HLR) 802 contains a database (not shown) including relevant subscriber information for provision of telecommunication service. A CCITT specified network 804 interconnects the individual parts of the system 800. A dictionary gateway 806 is a switching unit routing a requested dictionary to a mobile communication apparatus 808-812. A Dictionary Service Center 814  
30 (DSC) and the dictionary gateway 806 handle and routes the dictionaries between the DSC 814 and the network 804. From the network 804, the dictionaries are routed to the mobile communication apparatuses 808-812 via a Mobile Switching Center (MSC) 816 to a Base Station Controller (BSC) 817

and a Base Transceiver Station (BTS) 820, 821, or a Radio Network Controller (RNC) 818 and a Node B 822. Alternatively, the dictionaries are routed to the mobile communication apparatuses 808-812 via a Serving GPRS Support Node (SGSN) 826, 828 to the BSC 817 and the BTS 820, 821, or the RNC 818 and the Node B 822, respectively. The BTS 820, 821 or the Node B 822 establish the air connection to the mobile communication apparatuses 808-812.

According to an embodiment of the present invention, a network operator or other third party company, for example the provider of the application, handling a dictionary server 824 could offer a dictionary service function where dictionaries associated with certain applications can be purchased. For example a network operator may have a dictionary server 824 supporting a feature where the user may send a dictionary request from his mobile communication apparatus 808-812 to the dictionary server 824 upon using a certain application of the mobile communication apparatus, e.g. a gaming or messaging application.

The invention can be computer-implemented, i.e. the media handling is performed on a general or dedicated computerized apparatus 901, such as a personal computer, a mobile phone, a digital camera, a personal digital assistant, a media player, or other similar apparatus. Instructions for performing the invention can then be executed by the apparatus. These instructions can be loaded into the apparatus 901 from a computer-readable medium 902, as exemplary illustrated in Fig. 9, having a data structure stored. The data structure comprises the control instructions, which upon execution causes the apparatus to perform any of the embodiments of the present invention as described above.

Figure 10 illustrates a user interface (UI) 1001 in a portable apparatus having an input interface 1002, which as described in above embodiments can be actuated by a user, and a display interface 1004 for displaying information to the user as described in the above embodiments of the present invention.

While the embodiments of the present invention have been described with specificity to handheld communication devices, other types of computing devices with which the embodiments can be used will occur to those skilled in the art. For example, a personal computer can benefit from the invention in the same manner as the handheld communication device. Further, while the illustrated embodiments discuss the use of user-configurability, the user-configurability may be implicit or provided in some other manner than described above. The above-described embodiments of the invention are intended to be examples of the invention and alterations and modification may be affected thereto, by those skilled in the art, without departing from the scope of the invention, which is defined solely by the claims appended hereto.

CLAIMS

1. A method for a portable apparatus, comprising:  
5 enabling said portable apparatus for text input, comparing inputted text with text in an adaptive predictive text dictionary; prioritizing matches in said comparison and listing said matches based on said prioritizing in a priority list; displaying of said priority list; enabling selection from said displayed priority list; and enabling updating of said adaptive predictive text dictionary based on  
10 said selection.
2. The method according to claims 1, wherein said updating of said adaptive predictive text dictionaries based on any of the group: analysis of said inputted text, analysis of said selected text in said priority list, and  
15 statistics based on said inputted text and selected words in said displayed priority list.
3. The method according to claim 1 or 2, further comprises initialization of said adaptive predictive text dictionary, wherein said initialization determines  
20 at least one of the group comprising: current user, current application, and recipient.
4. The method according to any of the previous claims 1-3, communicating by wire or wirelessly with an external server via a network for  
25 acquiring said adaptive predictive text dictionary.
5. The method according to claim 4, storing said adaptive predictive text dictionary via said network and retrieving said adaptive predictive text dictionary from said external server.  
30
6. A rendering application for a portable apparatus comprising a display and navigation means, said application arranged to cause enabling of said portable apparatus for text input, comparing inputted text with text in an

adaptive predictive text dictionary; prioritizing matches in said comparison and listing said matches based on said prioritizing in a priority list; displaying of said priority list; enabling selection from said displayed priority list; and enabling updating of said adaptive predictive text dictionary based on said  
5 selection.

7. The application according to claim 6, arranged for updating said adaptive predictive text dictionaries based on any of the group: analysis of said inputted text, analysis of said selected text in said priority list, and  
10 statistics based on said inputted text and selected words in said displayed priority list.

8. The application according to claim 6 or 7, arranged for initialization of said adaptive predictive text dictionary, and from said initialization determine  
15 at least one of the group comprising: current user, current application, and recipient.

9. The application according to any of the previous claims 6-8, arranged for communicating by wire or wirelessly with an external server via a network  
20 for acquiring said adaptive predictive text dictionary.

10. The application according to claim 9, arranged for storing said adaptive predictive text dictionary via said network and retrieving said adaptive predictive text dictionary from said external server.  
25

11. An apparatus comprising a display and a comparator arranged to receive a user input, wherein said user input comprise of a text input, compare inputted text with text in an adaptive predictive text dictionary, a processor arranged to prioritize and list matches of an output of said  
30 comparator in a priority list, wherein said display is arranged to, under control of said processor to display said priority list, and wherein said user input selection from said displayed priority list, wherein said processor is arranged to update said adaptive predictive text dictionary based on said selection.

12. The apparatus according to claim 11, further comprising a renderer for updating said adaptive predictive text dictionaries based on any of the group: analysis of said inputted text, analysis of said selected text in said priority list, and statistics based on said inputted text and selected words in said displayed priority list.

13. The apparatus according to claim 11 or 12, further comprising a renderer for initialization of said adaptive predictive text dictionary, wherein said initialization determines at least one of the group comprising: current user, current application, and recipient.

14. The apparatus according to any of the previous claims 11-13, further comprising a renderer for communicating by wire or wirelessly with an external server via a network for acquiring said adaptive predictive text dictionary.

15. The apparatus according to claim 14, further comprising a renderer for storing said adaptive predictive text dictionary via said network and retrieving said adaptive predictive text dictionary from said external server.

16. A computer program product comprising program code means stored in a computer-readable medium, the program code means being adapted to enable said portable apparatus for text input, comparing inputted text with text in an adaptive predictive text dictionary; prioritizing matches in said comparison and listing said matches based on said prioritizing in a priority list; displaying of said priority list; enabling selection from said displayed priority list; and enabling updating of said adaptive predictive text dictionary based on said selection.

17. The computer program product according to claim 16, further comprising instructions for updating said adaptive predictive text dictionaries based on any of the group: analysis of said inputted text, analysis of said

selected text in said priority list, and statistics based on said inputted text and selected words in said displayed priority list.

18. The computer program product according to claim 16 or 17, further  
5 comprising instructions for initialization of said adaptive predictive text dictionary, wherein said initialization determines at least one of the group comprising: current user, current application, and recipient.

19. The computer program product according to any of the previous claims  
10 16-18, further comprising instructions for communicating by wire or wirelessly with an external server via a network for acquiring said adaptive predictive text dictionary.

20. The computer program product according to claim 19, further  
15 comprising instructions for storing said adaptive predictive text dictionary via said network and retrieving said adaptive predictive text dictionary from said external server.

21. A system comprising an apparatus and a dictionary server wherein  
20 said apparatus comprises a memory storing a set of instructions, and a processor, executing the stored set of instructions, to perform a method comprising determining an application to be executed;  
determining a dictionary associated to said determined application; and  
enabling said associated dictionary, and  
25 said dictionary server is arranged to provide the associated dictionary for downloading.

22. The system according to claim 21, further comprising a  
communications network, wherein the adaptive predictive text dictionary  
30 server and the apparatus is in communication via the communications network.



23. A user interface comprising a display, and an input receiver, wherein said user interface is arranged to; enable a portable apparatus for text input where said inputted text are compared with text in an adaptive predictive text dictionary, and where matches of said comparisons are prioritized and listed in a priority list; display said priority list in said display.

5

1/9

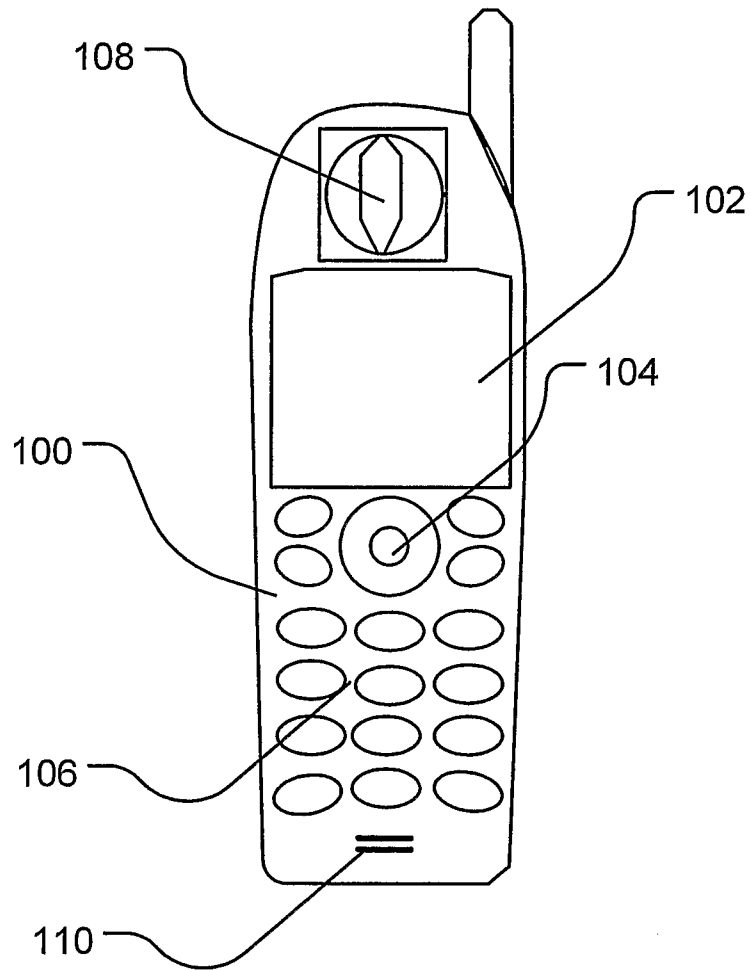


Fig. 1

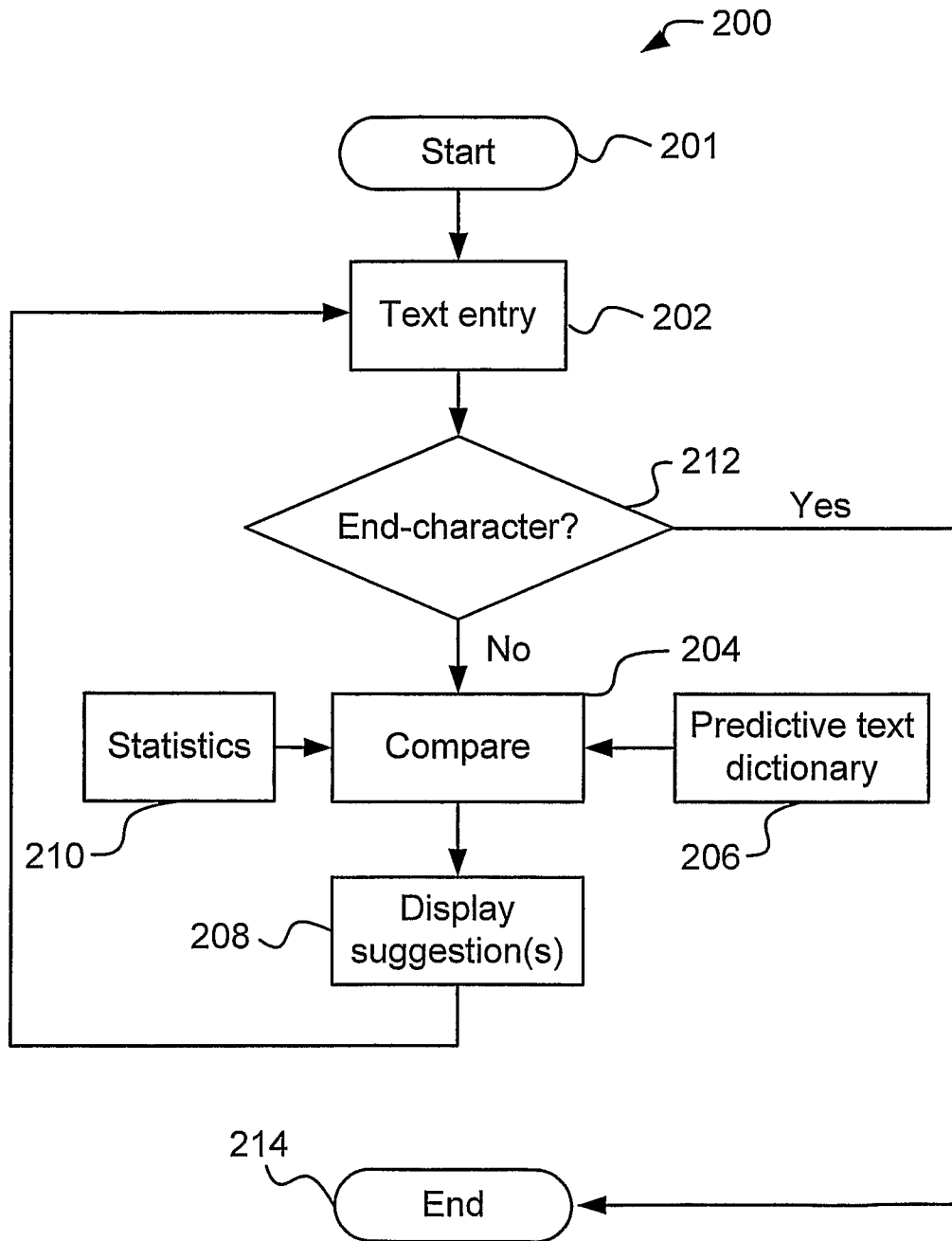


Fig. 2

3/9

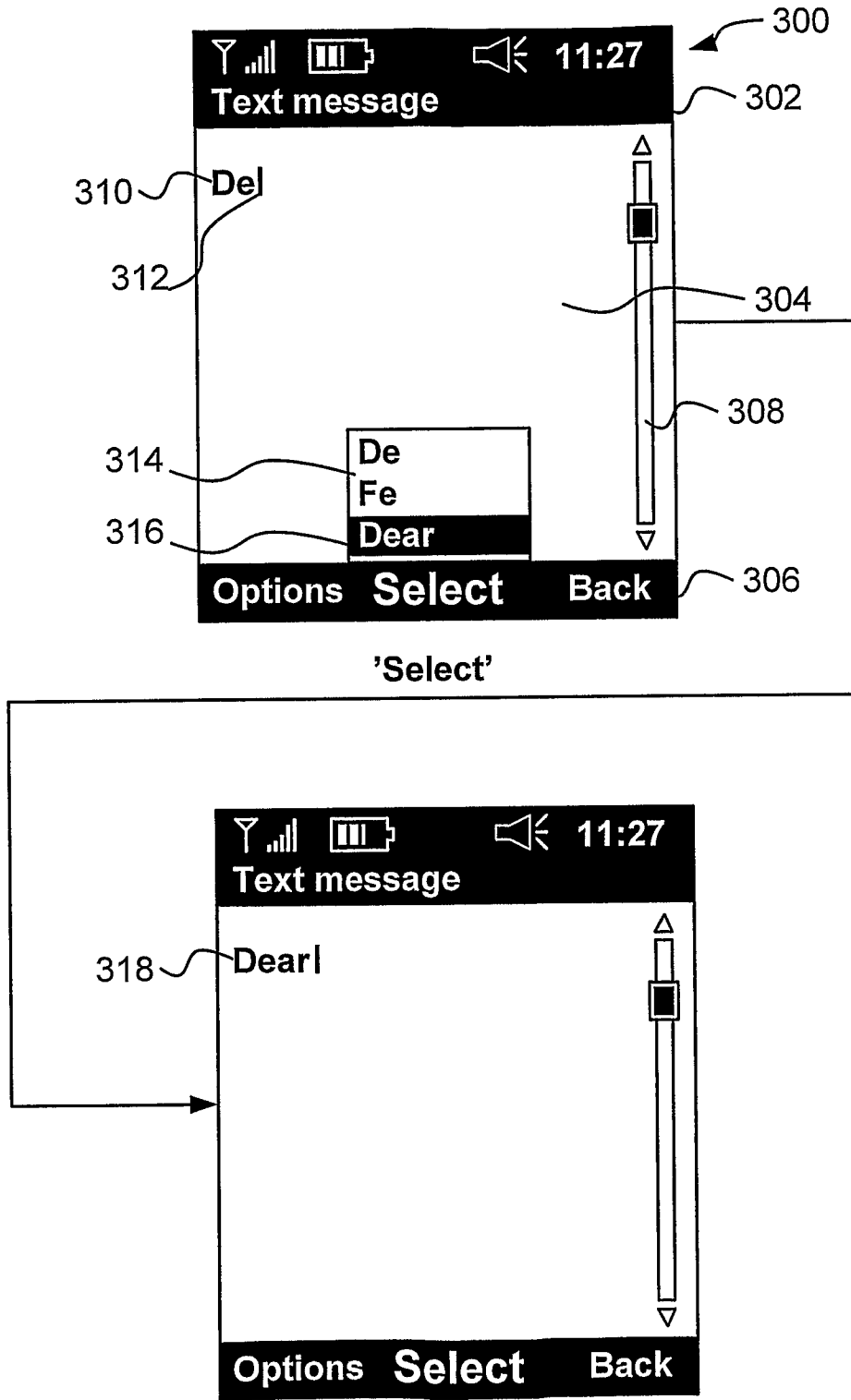


Fig. 3

4/9

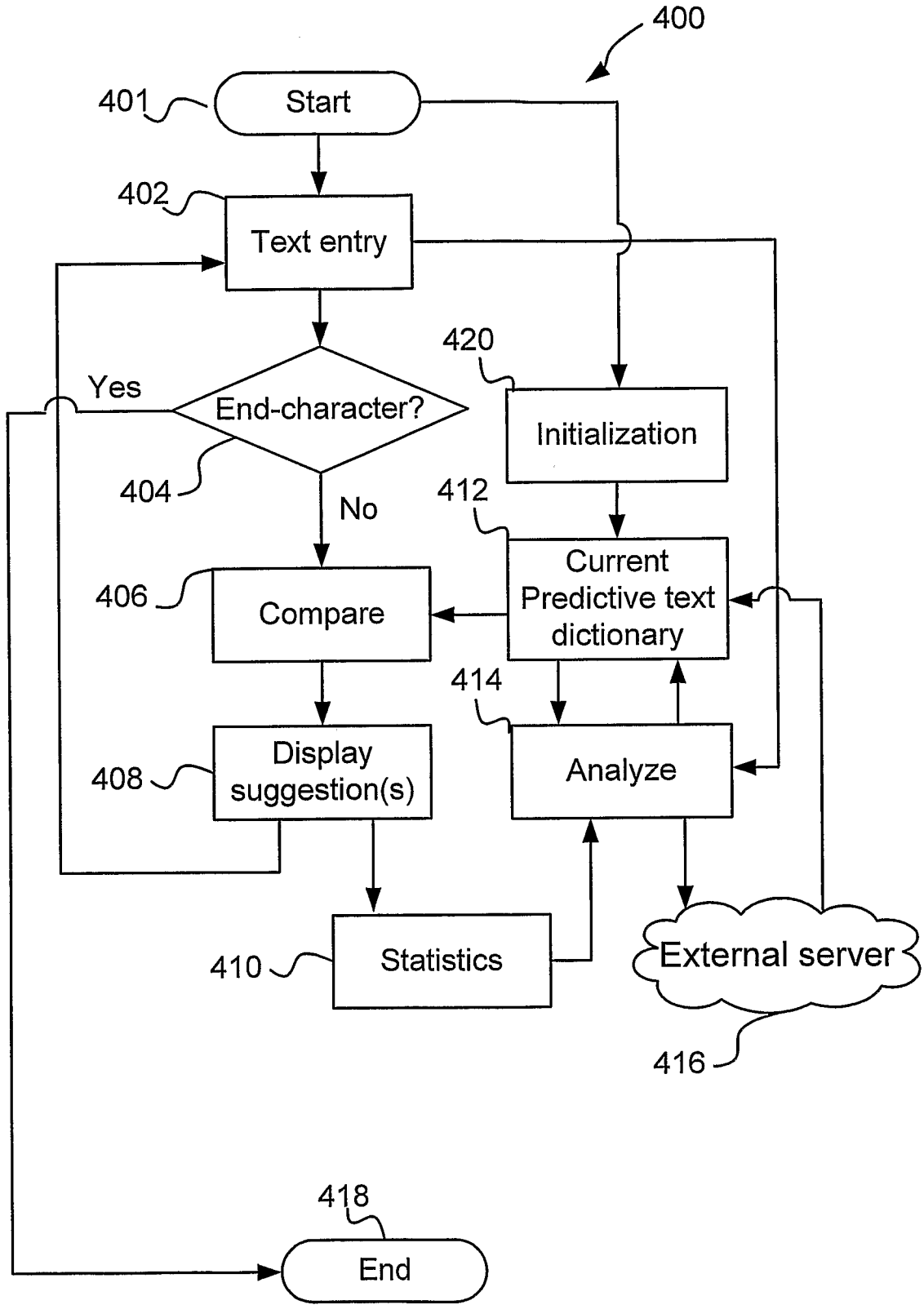


Fig. 4

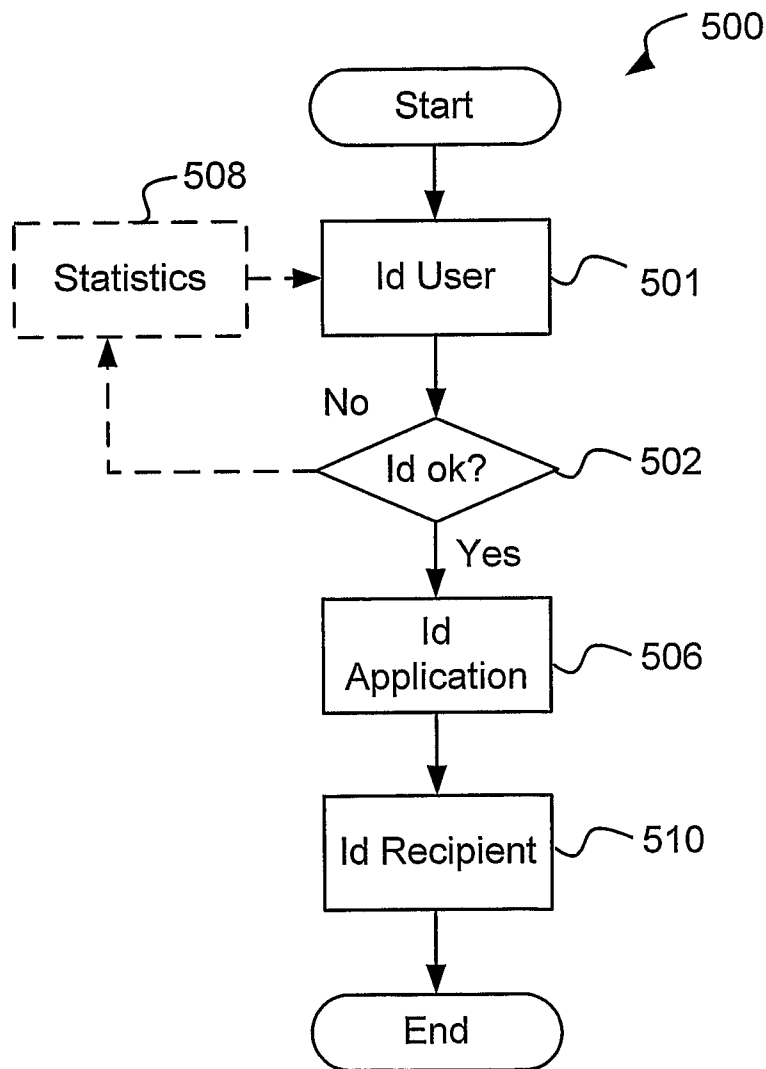


Fig. 5

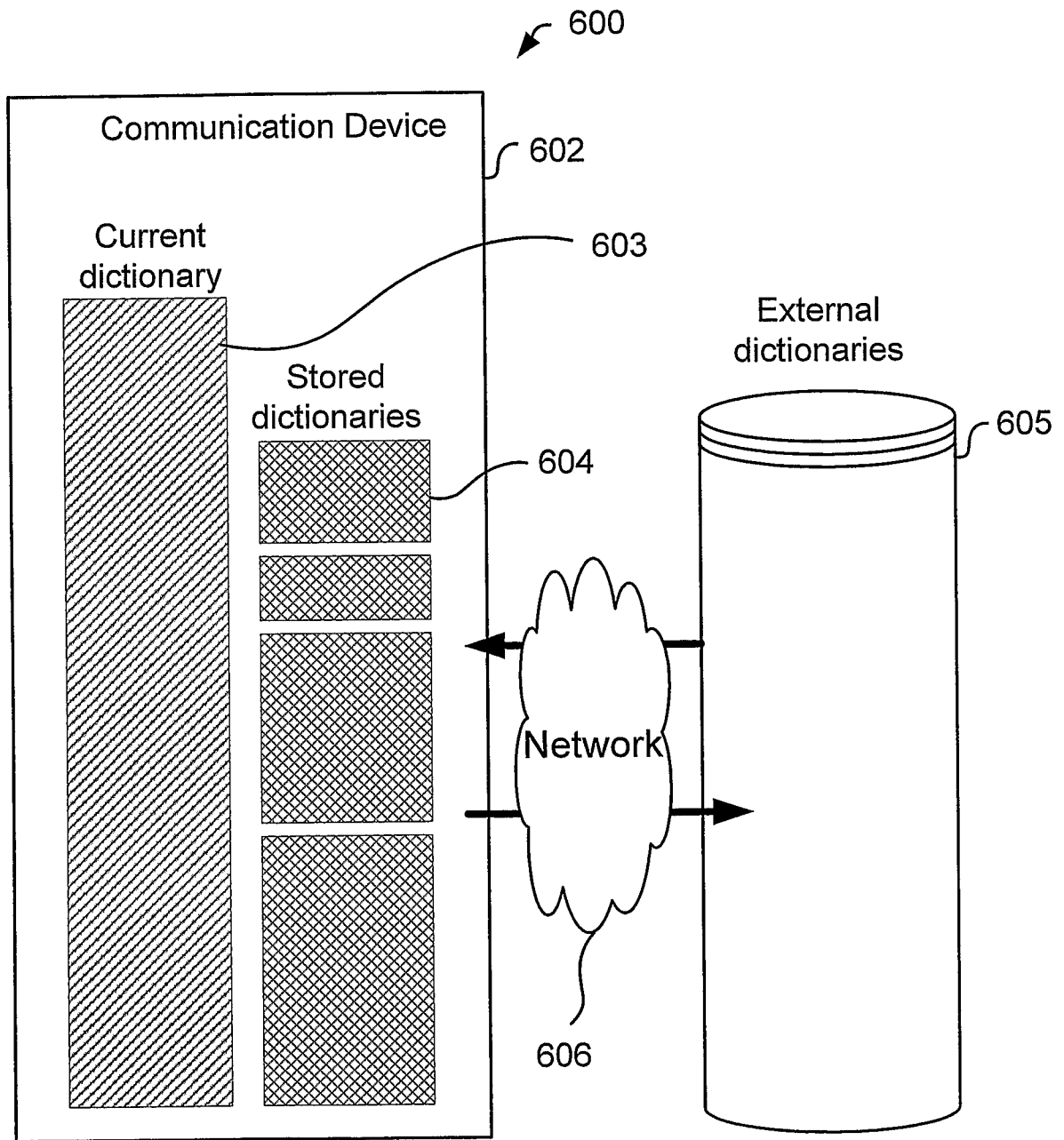


Fig. 6

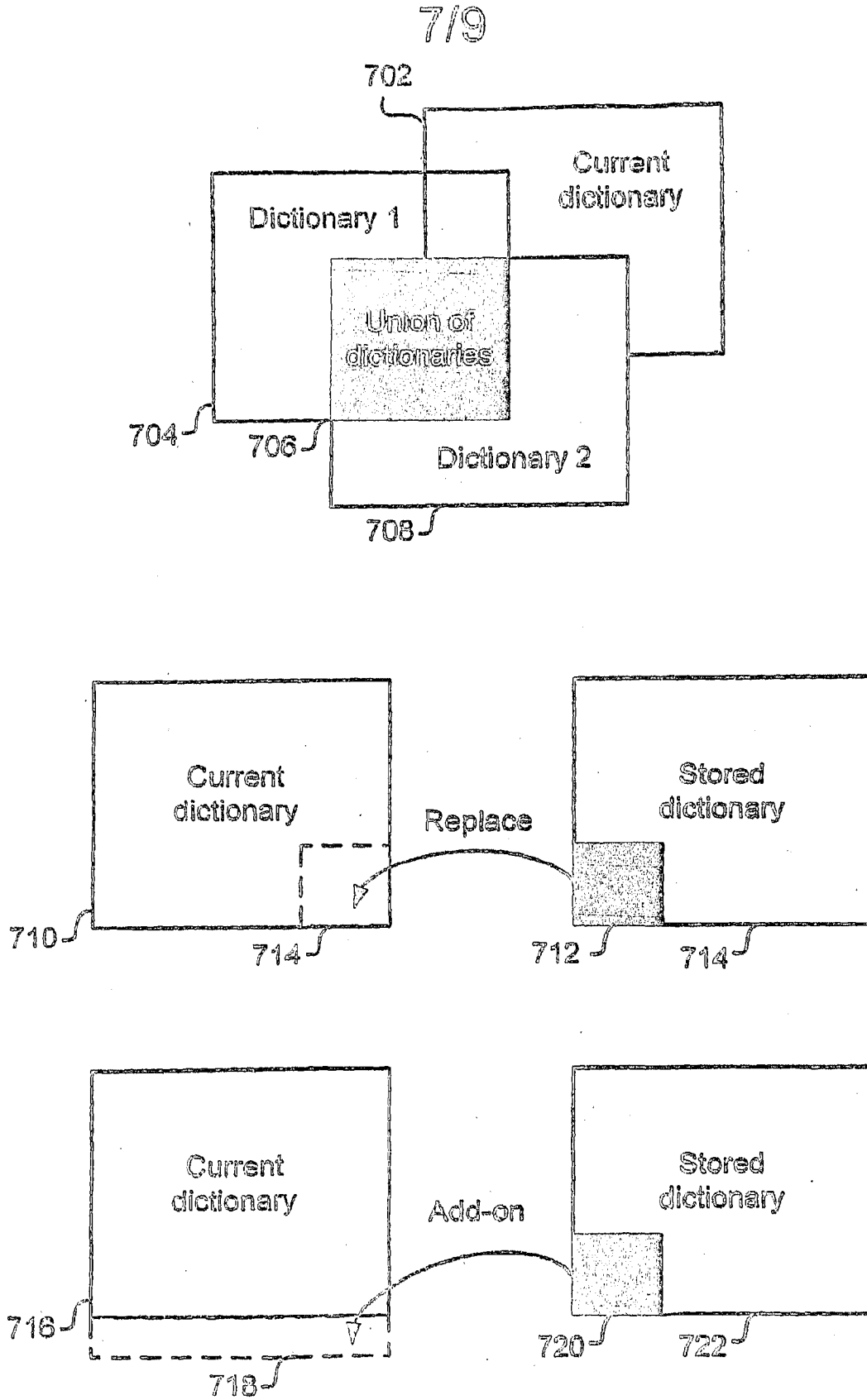


Fig. 7



8/9

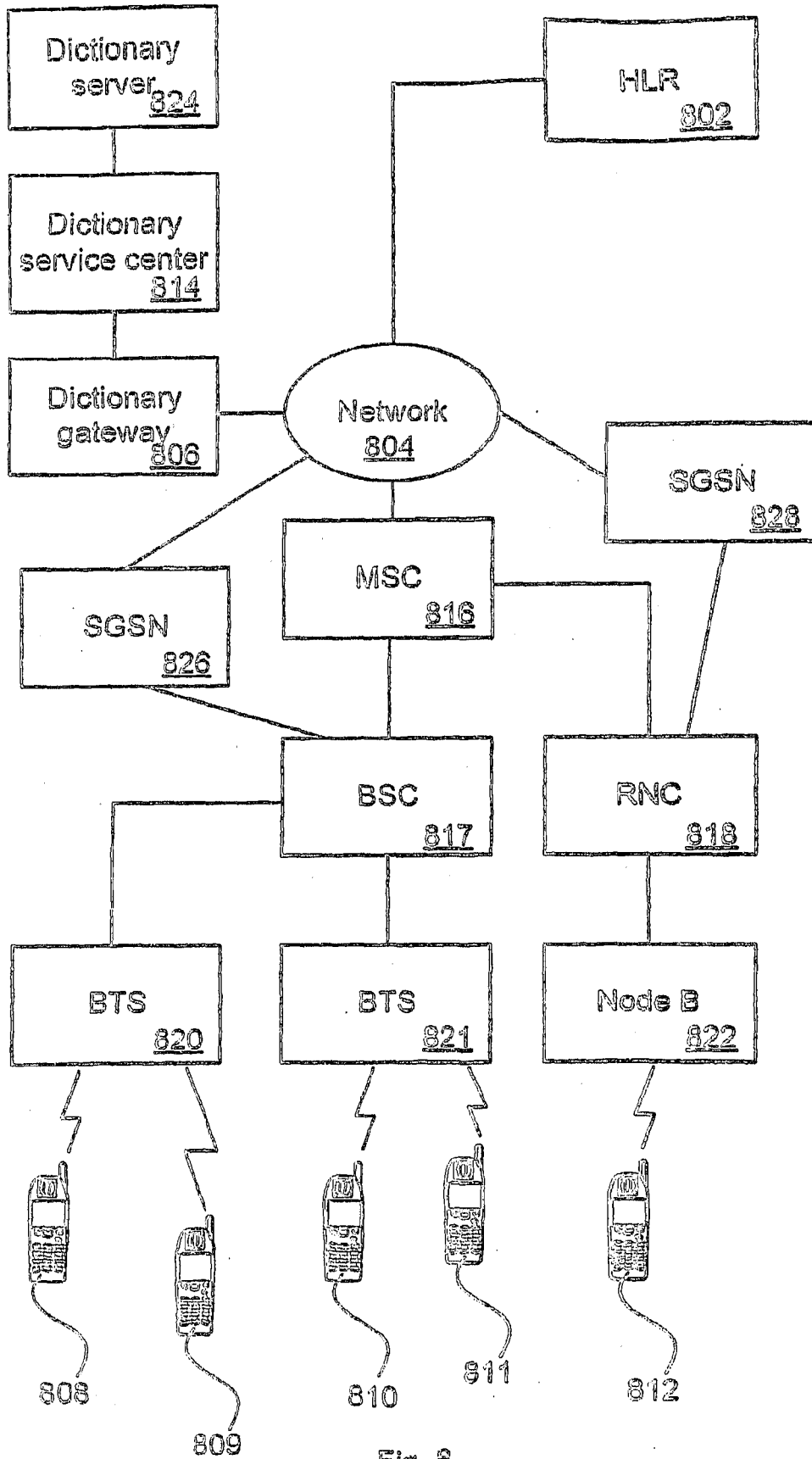


Fig. 8

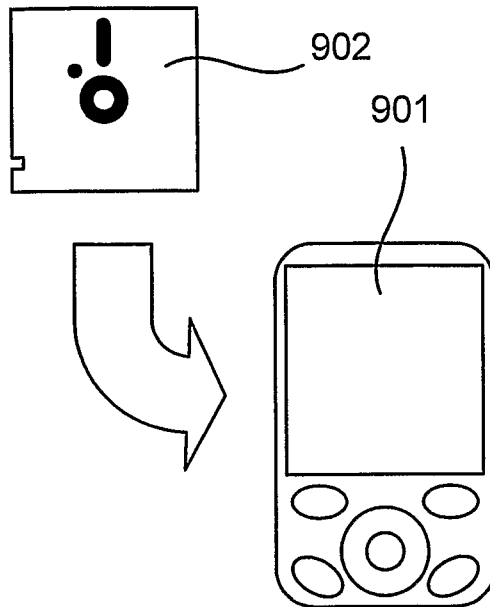


Fig. 9

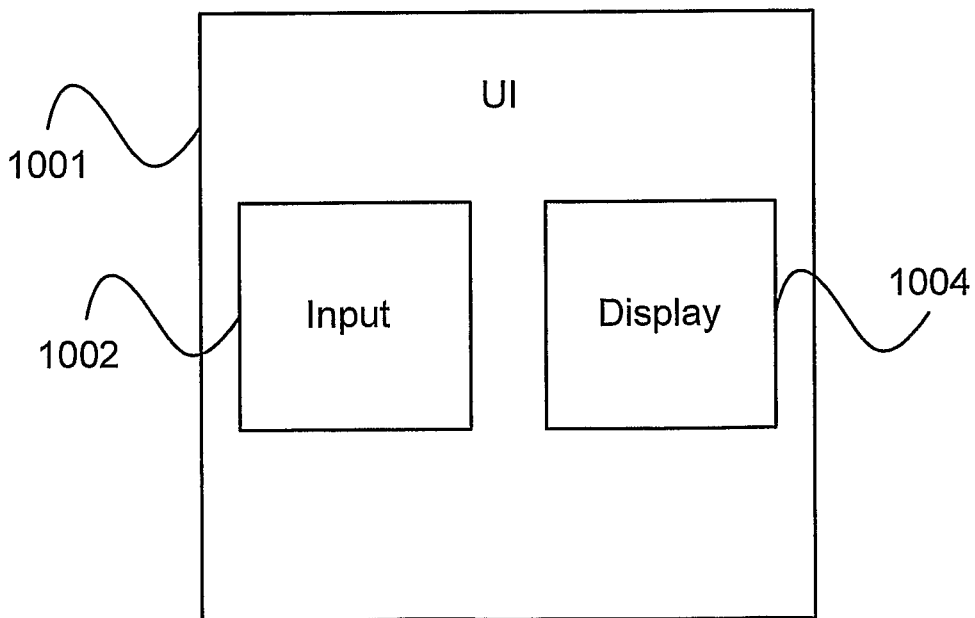


Fig. 10

# INTERNATIONAL SEARCH REPORT

International application No <b>PCT/IB2007/001400</b>
--

**A. CLASSIFICATION OF SUBJECT MATTER**  
INV. G06F17/27

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
**G06F**

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**EPO-Internal, WPI Data**

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/289141 A1 (BALUJA SHUMEET [US]) 29 December 2005 (2005-12-29) abstract column 4, line 29 - column 6, line 29 column 11, lines 65-67 column 12, line 29 - column 13, line 18; figure 2a  <div style="text-align: center;">----- -/--</div>	1-23

Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- \*8\* document member of the same patent family

Date of the actual completion of the international search

**28 March 2008**

Date of mailing of the international search report

**07/04/2008**

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2  
 NL - 2280 HV Rijswijk  
 Tel. (+31-70) 340-2040. Tx. 31 651 epo nl.  
 Fax. (+31-70) 340-3016

Authorized officer

**Woods, Justin**

## INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2007/001400

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 896 321 A (MILLER JOHN W [US] ET AL) 20 April 1999 (1999-04-20)  paragraphs [0001] - [0014] paragraph [0026]; figure 1 paragraph [0032] paragraph [0038] paragraph [0047] paragraph [0053] paragraph [0070] paragraph [0074] paragraph [0077]	1,2,6,7, 11,12, 16,17,23
A	----- US 2006/247915 A1 (BRADFORD ETHAN R [US] ET AL) 2 November 2006 (2006-11-02) abstract paragraph [0023] paragraphs [0038], [0039] paragraphs [0477] -- [0488]	1-23
A	----- WO 2006/078912 A (PARIKH PRASHANT [US]) 27 July 2006 (2006-07-27) abstract page 7, line 8 - page 9, line 6	1-23
A	----- US 2007/005336 A1 (PATHIYAL KRISHNA K [CA] ET AL) 4 January 2007 (2007-01-04) pages 36-41; figure 5	3

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2007/001400

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005289141 A1	29-12-2005	AU 2005259925 A1 CA 2572215 A1 EP 1769401 A2 US 2006230350 A1 WO 2006004771 A2	12-01-2006 12-01-2006 04-04-2007 12-10-2006 12-01-2006
US 5896321 A	20-04-1999	NONE	
US 2006247915 A1	02-11-2006	NONE	
WO 2006078912 A	27-07-2006	US 2006167872 A1 US 2006217953 A1	27-07-2006 28-09-2006
US 2007005336 A1	04-01-2007	NONE	